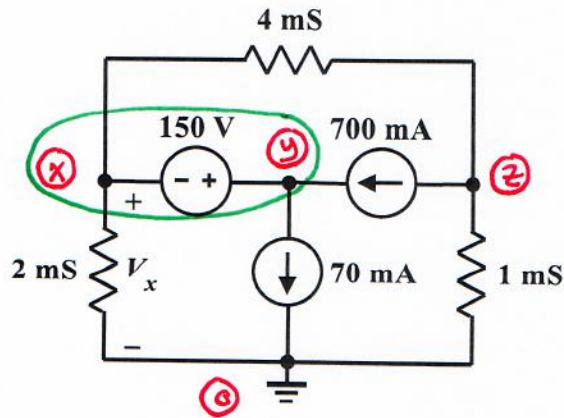


Homework Problem #013

Develop node equations and express them in the matrix form discussed in class. Then, using a method of your choosing, solve for V_x .



$$V_y - V_x = 150 \quad (\text{constraint})$$

$$0.004(V_x - V_z) - 0.7 + 0.07 + 0.002V_x = 0 \quad (\text{KCL for the supernode})$$

$$0.004(V_z - V_x) + 0.7 + 0.001V_z = 0 \quad (\text{KCL for node z})$$

In matrix form:

$$\begin{bmatrix} -1 & 1 & 0 \\ 0.006 & 0 & -0.004 \\ -0.004 & 0 & 0.005 \end{bmatrix} \begin{bmatrix} V_x \\ V_y \\ V_z \end{bmatrix} = \begin{bmatrix} 150 \\ 0.63 \\ -0.7 \end{bmatrix}$$

Solving yields:

$$V_x = 25 \text{ V}$$